Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_

**Physical Science: Ch. 17 and 18 Electricity and Magnetism Test**

**Part I: Multiple Choice** Use CAPITAL letters. (1 point each)

|  |  |  |  |
| --- | --- | --- | --- |
| \_\_\_\_\_\_\_\_\_ 1. | Magnetic field lines | | |
|  | A. run magnetically east to west | | C. never cross each other |
|  | B. run geographically north to south | | D. all of the above |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 2. | Whether or not charges will move in a material depends partly on how tightly \_\_\_\_\_\_\_ are held. | | |
|  | A. electrons | | C. protons |
|  | B. neutrons | | D. resistors |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 3. | Electric force varies depending on the | | |
|  | A. charge and distance between charged  objects | | C. height and mass of charged objects |
|  | B. charge and mass of charged objects | | D. mass and distance between charged  objects |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 4. | The unit resistance is measured in is | | |
|  | A. volt | | C. ohm |
|  | B. ampere | | D. joule |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 5. | When there is an equal amount of positive and negative charges on an object, the object | | |
|  | A. positively charged | | C. neutral |
|  | B. negatively charged | | D. supercharged |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 6. | Current is the rate at which charges move through a(n) | | |
|  | A. conductor | | C. voltage |
|  | B. insulator | | D. joule |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 7. | What causes a compass needle to point to Geographic North? | | |
|  | 1. The pole of the compass is attracted to Earth’s Geographic North Pole. | | C. The compass needle aligns with Earth’s  Magnetic North Pole. |
|  | 1. The compass needle aligns with   Earth’s Magnetic South Pole | | D. The pole of the compass is attracted to  Earth’s Geographic South Pole. |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 8. | The strength of a magnetic field created by current in a wire can be increased by | | |
|  | A. using shorter wire | | C. using longer wire |
|  | B. decreasing the current in the wire | | D. wrapping the wire into a coil |
|  |  | |  |
| \_\_\_\_\_\_\_\_\_ 9. | A region where a magnetic force can be detected is a(n) | | |
|  | A. electric current | | C. magnetic field |
|  | B. gravitational attraction | | D. potential circuit |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 10. | If the poles of two magnets repel each other, | | |
|  | A. both poles must be south poles | | C. one pole is south and the other is north |
|  | B. both poles must be north poles | | D. the poles are the same type |
|  |  | |  |
| \_\_\_\_\_\_\_\_11. | An electric current does ***not***exist in | | |
|  | A. a closed circuit | | C. a parallel circuit |
|  | B. a series circuit | | D. an open circuit |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 12. | Which of the following can help prevent a circuit from overloading? | | |
|  | A. a resistor | | C. circuit breaker panel |
|  | B. a switch | | D. a galvanometer |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 13. | The magnetic field of a magnet is strongest \_\_\_\_\_\_\_\_\_\_\_\_ the magnet. | | |
|  | A. at the center of | | C. far away from |
|  | B. near the poles of | | D. perpendicular to |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 14. | The direction of the magnetic field produced by a current-carrying wire can be determined using | | |
|  | A. the right hand-rule | | C. an electric motor |
|  | B. the left hand-rule | | D. a lodestone |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 15. | Magnetism is caused by | | |
|  | A. canceling charges | | C. opposite charges |
|  | B. like charges | | D. moving charges |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 16. | An electric motor converts electrical energy into | | |
|  | A. mechanical energy | | C. current |
|  | B. kinetic energy | | D. charge |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 17. | The magnetism of a piece of magnetized iron can be weakened by | | |
|  | A. heating the iron and hammering it | | C. bending the iron |
|  | 1. putting it near a piece of   unmagnetized iron | | D. none of the above |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 18. | What causes the armature (rotating wire) to spin in an electric motor? | | |
|  | A. a change in voltage | | C. increase in current |
|  | 1. a change in current which changes   the magnetic field | | D. brushes are demagnetized |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 19. | A set of electric trains are powered by a 9-V battery. What is the resistance of the trains if they draw 3.0 A of current? | | |
|  | A. 3 **Ω** | | C. 27 **Ω** |
|  | B. 0.03 **Ω** | | D. 2.7**Ω** |
|  |  | |  |
| \_\_\_\_\_\_\_\_ 20. | An example of a naturally occurring magnetic rock is | | |
|  | A. limestone | C. lodestone | |
|  | B. iron | D. magicmagnetope | |
|  |  |  | |
| \_\_\_\_\_\_\_\_ 21. | Electric field lines show the strength and \_\_\_\_\_\_\_\_\_\_\_\_ of an electric field. | | |
|  | A. friction | C. mood | |
|  | B. gravity | D. direction | |

**Part II: True or False** Write T or F. If false, correct the underlined word to make the statement read true.

(2 points each)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 21. Alternating current is a measure of how strongly an object resists current flow.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 22. Conductors are materials that block the flow of current.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 23. A solenoid is a coil of current-carrying wire wrapped around a ferromagnetic material.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 24. Iron is an example of a ferromagnetic material which means that it is a material that

can become magnetic.

**R=V**

**I**

**Part III: Short Answer** Complete sentences are **NOT** necessary. (3 points each)

25. Calculate the current in a circuit that contains a 12V battery and a speaker with 2 ohms of resistance?

Formula: Solution: Answer:

26. You have a large flashlight that takes FOUR D-cell batteries. If the current in the flashlight is 2 amps, what

is the resistance of the light bulb? (Hint: ONE D-cell battery has 1.5V)

Formula: Solution: Answer:

27. **Complete the statement**. Earth’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ protects us from the Sun’s solar winds and

radiation. Near the polar regions, we are sometimes able to see the interactions between the solar winds

and this region identified above, and are referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

28. Describe the advantage of using a parallel circuit arrangement of decorative lights on your house rather

than a series circuit arrangement.

29. What affect does *increased* resistance have on a circuit?

30. Explain why an electromagnet is used at scrap metal yards versus a permanent magnet.

31. Describe how a MagLev train is able to *levitate* above the track? Be specific with vocabulary!

**Part IV: Extended Response** Complete sentences **ARE** required. Explain all answers in **detail**! (5 points each)

32. Why do you sometimes shock yourself after getting out of your car in the wintertime? Be specific with

vocabulary!!

33. List and describe **3** ways that can increase the strength of a solenoids magnetic field. Explain **WHY EACH**

increases the strength of the solenoid.